DEPARTMENT OF TRANSPORTATION
MATERIALS TRANSPORTATION BUREAU
WASHINGTON, D.C. 20590

49 CFR Parts 173 and 175

[Docket No. HM-152; Amdt. Nos. 173-136, 175-13]

Requirements for Transportation of Radioactive Materials

AGENCY: Materials Transportation Bureau, Research and Special Programs Administration, DOT.

ACTION: Final rule.

SUMMARY: The purpose of this final rule is to amend the Hazardous Materials Regulations pertaining to the transportation of radioactive materials aboard aircraft by: (1) reducing the maximum and average radiation level in a passenger compartment of a passenger-carrying aircraft by increasing the separation distance required between the passenger compartment and any package(s) bearing a Radioactive Yellow-II or Radioactive Yellow-III label, and by ·ing the maximum allowable ›ort index (T.I.) from 10.0 to 3.0 for package of radioactive materials carried in any single compartment on a passenger-carrying aircraft; (2) providing for a system of predesignated areas ("spacing out") for stowage of radioactive materials packages aboard passenger-carrying aircraft based on the size and configuration of the particular aircraft involved; (3) increasing the allowable amount of radioactive materials aboard cargo-only aircraft when carried in accordance with specified loading requirements; and (4) establishing specific marking, labeling and T.I. limitations for radioactive materials packages combined in overpacks. The amendments are based primarily on a study conducted by the U.S. Atomic Energy Commission which recommended a reduction in the level of radiation exposure to passengers aboard aircraft.

EFFECTIVE DATE: October 1, 1980; however, shipments may be prepared, offered for transportation, and transported in accordance with these amendments beginning May 1, 1980.

ADDRESS: All written comments received under this rulemaking docket and the report specifically identified ·n are available for exam nation in the Dockets Branch, Materials Transportation Bureau, U.S. Department of Transportation, Washington, D.C. 20590. The Dockets Branch is located in Room 8426 of the Nassif Building, 400 Seventh Street, S.W., Washington, D.C. Public dockets may be reviewed between the hours of 8:30 a.m. and 5:00 p.m., Monday through Friday.

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SUPPLEMENTARY INFORMATION: On July 21, 1977, a notice of proposed rulemaking (Docket HM-152; Notice 77-6) was published in the **Federal Register** (42 FR 37427) announcing the Materials Transportation Bureau (MTB) intention of further restricting the transportation of radioactive materials aboard civil aircraft. These proposed changes to the regulations were prompted by a report titled "Recommendations for Revising Regulations Governing the Transportation of Radioactive Material In Passenger Aircraft" which was prepared by the U.S. Atomic Energy Commission (AEC) and transmitted to the Federal Aviation Administration (FAA) of the Department of Transportation (DOT) in July, 1974. The principal recommendation of this report is to reduce by approximately one-half the maximum permissible radiation level at seat height to 2 millirem per hour and the average radiation dose rate to 1 millirem per hour. In its subsequent discussions with the FAA and the successors of the AEC, the U.S. Nuclear Regulatory Commission (NRC) and the Energy Research and Development Administration (ERDA), the MTB determined that the proposed rules were necessary to attain a greater level of safety for passengers and crew members of passenger-carrying aircraft without unduly subjecting ground service personnel and crews of cargo-only aircraft to the threat of increased exposure to radiation.

Comments received in response to the notice of proposed rulemaking were evaluated on the basis of their: (1) applicability to this particular rulemaking; (2) effectiveness in helping to reduce radiation levels and (3) reasonableness of the methods by which this objective is to be realized. Comments were received from 37 different sources representing the views of air carriers and air carrier associations, organizations of airline employees, producers and associations of producers of nuclear materials, consumer interest groups, private individuals and various Federal agencies. The points raised by these commenters were generally reflective of the special interest each party foresaw as being impacted by such a rule change. The comments were very useful in preparing this final rule.

The most significant difference between the final rule and the proposed rulemaking is the absence of § 175.700(a)(5) which would have imposed restrictions for the transportation of radioactive materials based upon their half-life or susceptibility to rapid chemical deterioration. This particular issue drew the greatest amount of response with nearly one-third of the commenters objecting to it. Commenters pointed out that restricting radioactive materials according to half-life would not in and of itself be effective in reducing the level of radiation exposure since the prescribed limits will be effectively maintained through adherence of package transport index and distance separation factors. The MTB agrees with this conclusion and has therefore decided to eliminate the proposed restriction in this rulemaking.

One commenter who represents an international corporation which ships 20,000 radioactive shipments per month complained that "these regulations appear to be directed at our particular class of shipper for one mode of transportation." This commenter contended that "if a 'potential hazard' exists for air transportation, it would also exist for land and water transportation." Although the transportation of radioactive materials by modes other than air is not addressed in this docket, it must be pointed out that the short half-life of

radiopharmaceuticals requires rapid delivery such as that provided by aircraft, particularly passenger-carrying aircraft. This rapid delivery requirement has resulted in approximately 800,000 packages of radioactive materials being transported by passenger-carrying aircraft in 1975 ("Final Environmental Statement on the Transportation of Radioactive Material by Air and Other Modes," Dec. 77, NUREG–0170, pp. 1–11,16), as a consequence of this increased shipping activity the annual population dose from direct radiation exposure has risen beyond levels which are not "as low as reasonably achievable (ALARA)." This is not the case with radioactive materials being transported in passenger-carrying motor vehicles, rail cars and vessels, and similar regulatory actions are not warranted for these modes at the present time. The contention that the proposed regulations would be discriminatory to a particular class of shipper by establishing certain requirements relating to the use of overpacks is well taken. Consequently, the proposal has been broadened to permit the consolidation of radioactive materials packages by persons other than the original shipper, with the condition that their determination of the T.I. for the overpack be made by addition of the individual package T.I.'s and not actual measurements.

In response to the commenter who pointed out a discrepancy which would exist between the air and highway modes through separate requirements for the labeling of overpacks, the amendment provides an exception in § 173.393(r) permitting a single label to be applied on nonrigid overpacks as well as the use of the term "mixed" on this label. Under the proposal, "mixed radioactive materials" was the proposed description for use on a label affixed to an overpack containing different radionuclides. In this final rule, the description has been changed to "mixed" because the terms "radioactive" and "contents" already appear as part of the label and because of the limited availability of space on the label. Although the proposed rule did not make reference to any changes in Part 173, the MTB subsequently recognized that the requirements originally contained in proposed § 175.703(b) were more appropriate to shippers than to air carriers. Therefore, § 173.393 has been amended to reflect these requirements. In this way also, handling, marking, and labeling requirements for packages of radioactive materials contained in overpacks are now addressed for all modes of transportation.

One commenter who objected to any requirement for the additional labeling of clear plastic overpacks argues correctly that other hazardous materials in similar transparent overpacks are not subject to this requirement; however, for the benefit of cargo handlers the MTB believes that the presence of a label which specifies the composite T.I. is valuable in helping to reduce exposure time which would otherwise be spent in making a close examination of the individual packages. The hazards associated with radioactive materials dictate that standard procedures which apply to hazardous materials generally are not always adequate in reducing unnecessary risks. Therefore, this requirement has been included in the revised regulation.

A comment urging the MTB to reconsider its decision on maximum radiation levels at seat height did not contain new information to support a change from the rule as proposed. As mentioned earlier, the MTB is adopting a standard which is based on a maximum of 2 millirem per hour and an average 1 millirem per hour at seat height. This is a 50 percent reduction of the previously authorized limit. While it is obvious that the reduction of any radiation exposure is desirable, the imposition of a lower limit has not been shown to be of a significant benefit commensurate with its cost. There is a cutoff point where benefits begin to diminish very rapidly when additional measures in the form of increased shielding, lower transport index limitations, and distance separation factors are applied. As it was pointed out in the "Assessment of the Environmental Impact of the FAA Proposed Rulemaking Affecting the Conditions of Transport of Radioactive Materials on Aircraft" (BNWL–B–421) the question then is what is a reasonably achievable exposure limit and package T.I. limit? The MTB believes that the present data indicate these amended limits are as low as reasonably achievable.

Many other comments were submitted in response to Notice 77–6, however, their content was not considered useful in meeting the objectives of this rulemaking of reducing radiation levels and population exposure rates associated with the transportation of radioactive materials by air. Expanding this rulemaking to include the substance of these comments was determined to be inappropriate at this time.

The following is a section by section summary of the revised regulations which address particular comments contained in the docket.

PART 175—CARRIAGE BY AIRCRAFT

Section 175.75: Specifies T.I. limits for passenger-carrying and cargo-only aircraft. Several commenters objected to the 200 T.I. limitation for cargo-only aircraft contending that the MTB "has failed to demonstrate that there is a compelling need for lifting the current restriction" and that most aircraft are not physically capable of safely handling such large volumes. It should be pointed out that the 200 T.I. is a quantity limit which applies to the largest of aircraft. Small and intermediate aircraft will naturally be restricted to smaller cargo storage areas. The MTB has purposely increased the T.I. limit so that shippers and carriers might be encouraged to divert radioactive materials from passenger-carrying flights, thereby reducing the annual population dose.

Section 175.85: Changes the reference in paragraph (d) to read "§ 175.701." Several carriers sought an exception for radioactive materials in paragraph (b) which would permit their stowage in an inaccessible location on cargo-only aircraft. This particular item has already been specifically addressed in another rulemaking, Docket No. HM–168; Amdt. 175–11, which appeared in the **Federal Register** on January 31, 1980 (45 FR 6946).

Section 175.700: Provides regulations specific to radioactive materials on passenger-carrying aircraft. As mentioned earlier, the proposed restriction of radioactive materials by half-life has been dropped from the final rule. In paragraph (a)(3) the wording has been revised to permit loading not only on the floor of the cargo compartment but on the floor of an airfreight container as well. This action is being taken in response to one commenter who pointed out the added safety benefits afforded by containerized cargo. A number of commenters suggested additional requirements which would have specified a fr

cle of at least 20 inches from the top. surfaces of all packages to the nearest surface of the partition separating the cargo compartment from the passenger compartment, and stowage in the rear most practicable position in the aircraft. In the opinion of the MTB, this is simply another means of meeting the objective of reducing radiation exposure levels and it does not appear necessary to impose such particular requirements since package T.I. limits and distance separation factors provide the level of safety desired while still allowing carriers the opportunity to comply in a manner which is most appropriate to their operations.

Another commenter not able to find a specific provision covering the shipment of a "large radioactive source" recommended retention of the wording previously contained in § 175.700(c). Present constraints in the regulations under § 173.391 limit the carriage of radioactive materials by passenger-carrying aircraft to only those materials which are intended for use in, or incident to, research, or medical diagnosis or treatment and thus already have the effect of limiting most packages to ities considerably below p ble limits. Also, with the in. ction of a 3.0 T.I. package limit, large quantity packages would be prohibited to be shipped by passenger-carrying aircraft. This same commenter also noted the absence of paragraph (d) concerning the limitation of radioactive materials to those intended for use in, or incident to, research, or medical diagnosis or treatment. This oversight has been corrected in redesignated paragraph (c).

Section 175.701: Specifies separation distances on passenger-carrying aircraft. A number of commenters supported a complete revision of this section which would tend to concentrate packages of radioactive materials in the rear of the aircraft at shorter separation distances. This would have resulted in an average radiation level in the passenger compartment of 0.5. millirem per hour, but this average would be at the expense of particular passenger seating areas being subjected to a maximum radiation level of 5 millirem per hour. Since this plan does not meet the primary objectives of this rulemaking it was not considered desirable.

With regard to paragraph (b)(1), one commenter suggested that the words "these packages" be substituted for the phrase "each individual package" as found in the second sentence. The MTB agrees that the intent and meaning is more clearly related and the suggestion has been adopted. Also, in response to the oversight pointed out by one commenter the words "or predesignated area" have been added to the table contained in paragraph (b)(2).

A great deal of criticism was received in response to the separation distances prescribed in paragraph (b). Commenters argued that such a system is too complex to be workable in real world conditions especially when one considers variables such as short loading times, other hazardous materials on board, the presence of animals in cargo compartments and general cargo already loaded on the floor of the aircraft. Another commenter argued that a total transport index (TTI) of 3.0 to 10.0 be assigned to each aircraft cargo compartment taking into account the aircraft size. None of these suggestions were sufficiently justified to be incorporated into the final rule. The provisions of § 175.701(b) in this rulemaking are not a substantive change of existing regulations but rather a regulatory refinement which will more evenly distribute the packages of radioactive materials so that lower levels of exposure will be realized. To assign a TTI to each cargo compartment would unnecessarily restrict the amount of radioactive materials that may be carried while not commensurately reducing the maximum allowable exposure levels.

One commenter suggested that "the time is opportune to eliminate requirements to apply separation distances relating to animals" as this requirement is not one of the considerations of the International Atomic Energy Agency (IAEA) Regulations on the Safe Transport of Radioactive Materials. Considering that the effects of radiation exposure are also damaging to animals and they in turn represent an element of property which is subject to protection from hazardous materials transported in commerce, it is the opinion of the MTB that current separation requirements remain unchanged.

The concept of "predesignated areas" also drew the attention of numerous commenters. One carrier protested the intervention of the DOT in the carrier's prerogative for utilizing available space The carrier claimed this would amount to unnecessary government regulation and delay the implementation of changes prompted by aircraft modification, seasonal traffic flows or other influence from outside sources. It should be pointed out, however, that this is a voluntary election which the carrier is free to make and is only offered as an alternate means of safely transporting radioactive materials by passenger-carrying aircraft. To the commenter who objected to this proposal as being "not for safety but to increase the amount of radioactive packages which could be carried on passenger-carrying aircraft", the MTB notes that the utilization of predesignated areas must also insure an equivalent level of safety. In a similar manner the MTB rejects the lateral separation factor of 2 rather than 4 which was proposed by the same carrier who objected to the very idea of predesignated areas. There exists a threat of radiation level "peaking" from the additive effect of radiation emitted from each predesignated area when a factor of 2 is applied, possibly resulting in unacceptably high exposure levels.

Section 175.702: Comments received in response to this section were of a cursory nature. Some commenters questioned the 200 T.I. limit for cargo-only aircraft claiming that it is unrealistic since most aircraft can't handle more than 50 T.I. However, in order to provide an incentive which would be effective in helping to reduce the demand by shippers and carriers of radioactive materials for space on passenger-carrying aircraft, the 200 T.I. limit is considered reasonable for aircraft which are able to meet all separation requirements.

One commenter, who is a frequent shipper of radioactive materials, expressed a concern over the ability of specialized carriers of small parcels to comply with the distance separation requirements, as these carriers frequently use smaller aircraft in their operations. The problem is not a new one occasioned by the introduction of this section, and in fact one of the carriers mentioned by this commenter is presently operating under authority of

exemption number E-7060 which provides relief from the 50.0 T.I. limitation, while requiring a documented radiation protection program for carrier personnel. Additionally, the kind of operations permitted by the terms of this exemption were proposed for authorization in Docket HM-166B; Notice 79-8 (44 FR 29503) but, due to numerous adverse comments, the proposal was deleted from the amendment. The provisions in this amendment are considered by MTB to be sufficient to meet the needs of shippers without unduly jeopardizing safety.

A comment also addressed the distance separation requirements established in paragraph (b)(2) (i) and (iii). The representative of a foreign flag air carrier sought DOT compatibility with those regulations currently set forth by the International Air Transport Association (IATA). Basically, this would provide a system of steps between 50 and 200 T.I. with corresponding increases in separation distance beginning at 15 feet, 4 inches (4.65 meters) and progressing to 28 feet, 10 inches (8.75 meters). While the MTB is interested in consistency with international standards for the safe and smooth flow of goods, the restriction imposed in this amendment is not seen as a burden to commerce especially when one considers the 200 T.I. ceiling and the relative ease with which most cargo-only aircraft operating in international service would be able to handle such a load, in compliance with the DOT minimum.

Section 175.703: The proposals in this section (now § 173.393(r)) drew the overwhelming majority of adverse comments. Specifically, the commenters objected to the proposals for compression testing, marking and labeling of overpacks. Commenters contended that there were inconsistencies in the use of overpacks for packages of radioactive materials when compared to those for other hazardous materials. One commenter pointed out that marking and labeling of clear plastic overpacks is currently excepted by § 173.25(a) when the markings and labeling of the inside packages are visible. The commenter viewed the added requirements as an example of over-regulation by the government. Despite the commenters arguments, the MTB does not believe that there was sufficient support provided for the points raised to make a revision of the rule as proposed. As was discussed earlier in this document the relationship of time is a critical factor in the accumulation of a dose of radiation, and the availability of a label(s) with the aggregate T.I. entered thereon is seen as an effective means for reducing the time spent by ground handlers in determining the activity of the package for proper placement in the aircraft, surface transport vehicle or storage area.

One commenter argued that subjecting overpacked packages of radioactive materials in non-specification packagings to Type A container test requirements for compression was highly impractical. The commenter further stated that "The plastic bag overpack which we used is placed over a variety of box shapes and sizes. Therefore, each shipment prepared would technically have to be tested 24 hours prior to movement." This commenter also suggested that the limited quantity of radioactive materials permitted in non-specification packagings is a sufficient safeguard in and of itself to eliminate the need for a performance standard greater than the standard requirements for all packages presently called for in § 173.24. The MTB agrees with these comments especially since most overpacks would be composed to Type A packages which are permitted, in part, because of their ability to withstand heavy loads. Accordingly, this proposed requirement in paragraph (b)(2)(iv) has been eliminated from the final rule.

Another commenter, objecting to the proposed restriction in paragraph (b)(2)(viii) which would have prohibited the consolidation of packages from more than one original shipper, claimed the proposal was confusing since it didn't specify who was to be considered the original shipper; that is the manufacturer, distributor, or central hospital serving satellite facilities. This proposed restriction has been removed from the final rule since it would have eliminated some safety benefits, such as reduced radiation levels achieved by shielding from surrounding packages. To address the comment directly, it should be noted that any person initiating a shipping paper is considered to be the original shipper.

Another commenter was concerned about the proposed option of entering the words "mixed radioactive materials" on the label of overpacks and shipping papers in place of specifically identifying the particular radionuclides. This proposal has been modified in part with the present requirement for specifying each package and its radioactive materials contents by activity, physical and chemical forms, transport index and the like on the shipping papers being retained. However, considering that each individual package label already specifies the particular radionuclide(s) contained therein, and considering further the limited space available for such information, use of the generic description "mixed" is determined to be sufficient on labels applied on overpacks and this element of the proposed regulation has been adopted. The required information available from shipping papers was recognized as being too valuable to emergency response personnel and other interested persons to justify deletion of the requirement. To avoid possible confusion in completing the labeling requirements for an overpack containing packages of radioactive materials, guidance has been taken by specifying that the number of curies entries must be a cumulative total of all such similarly labeled packages contained therein the purposes of these regulations to marked on the label of an overpack be used in calculating maximum vehicle loading limitations and distance separation requirements.

A commenter suggested that the label entry "mixed radioactive materials" would be in conflict with parallel requirements found in the Official Air Transport Restricted Articles Tariff No. 6-D (CAB No. 82) which specify that each radionuclide must be identified on the Yellow-II and Yellow-III labels. This difference has been avoided by changing the sense of proposed § 175.703(b)(2)(i) from a mandatory requirement to a permissive use of the word "mixed" in the contents entry on the label.

In this section also, one commenter recommended compatibility with the IATA separation requirements from undeveloped film. As no evidence was presented which would support this commenter's desire to promote uniform standards while adequately protecting other property at the same time, the more restrictive distance separations imposed by this section have been retained. However, the units of measure have been revised to include meters.

It should be noted that this

endment does not include the previously authorized option contained in § 175.710(c)(3) applicable to the carriage of Fissile Class III radioactive materials. As the MTB has received no requests for approval of procedures other than those specified in subparagraphs (c)(1) and (2) it was determined that retention of this approval system was unnecessary.

In consideration of the foregoing, Parts 173 and 175 of Title 49, Code of Federal Regulations are amended as follows:

1. In § 173.393, paragraphs (q) and (r) are added to read as follows:

§ 173.393 General packaging and shipment requirements.

* * * * *

(q) No person may offer for transportation aboard a passenger-carrying aircraft any single package with a transport index greater than 3.0 nor an overpack with a transport index greater than 3.0.

(r) If an overpack is used to consolidate individual packages of radioactive materials, the packages must comply with the packaging, marking, and labeling requirements of this subchapter, and the following additions must be met:

(1) The overpack must be labeled as prescribed in § 172.403 of this subchapter except as follows:

(i) The "contents" entry on the label may state "mixed" unless each inside package contains the same radionuclide(s).

(ii) The "number of curies" entry on the label must be determined by adding together the number of curies of the radioactive materials packages contained therein.

(iii) For a non-rigid overpack, the required label together with required package markings must be affixed to the overpack by means of a securely attached, durable tag. The transport index must be determined by adding together the transport indexes of the radioactive materials packages contained therein.

(iv) For a rigid overpack, the transport index must be determined by—

(A) Adding together the transport indexes of the radioactive materials packages contained in the overpack; or

(B) Except for fissile radioactive materials, direct measurements as prescribed in § 173.389(i)(1) which have been taken by the person initially preparing the packages contained within the overpack for shipment.

(2) The overpack must be marked as prescribed in Subpart D of Part 172 of this subchapter and § 173.25(a).

(3) The transport index of the overpack may not exceed 3.0 for passenger-carrying aircraft shipments, nor 10.0 for cargo-only aircraft shipments.

2. In § 175.75 paragraph (a)(3) is revised to read as follows:

§ 175.75 Quantity limitations aboard aircraft.

(a) * * *

(3) Packages containing radioactive materials when their combined transport index number (determined by adding together the transport index numbers shown on the labels of the individual packages and/or overpacks)—

(i) In passenger-carrying aircraft, exceeds 50.0, or

(ii) In cargo-only aircraft, exceeds 200.0 (for fissile radioactive materials, see § 175.702(b)(3)).

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3. In § 175.85 paragraph (d) is amended by changing the section reference 175.700 in the last line to read "§ 175.701."

4. § 175.700 is revised to read as follows:

§ 175.700 Special limitations and requirements; radioactive materials packages in passenger-carrying aircraft.

(a) In addition to other requirements, no person may carry in a passenger-carrying aircraft any package required to be labeled in accordance with § 172.403 of this subchapter with a Radioactive Yellow-II or Radioactive Yellow-III label unless—

(1) For a package required to be labeled Radioactive Yellow-II, the transport index does not exceed 1.0;

(2) For a package required to be labeled Radioactive Yellow-III, the transport index does not exceed 3.0;

(3) The package is carried on the floor of the cargo compartment, or freight container; and

(4) The package is carried in the aircraft in accordance with §§ 175.85(d), 175.701, and 175.703(c).

(b) In addition to the reporting requirements of § 175.45, the carrier must also notify the shipper at the earliest practicable moment following any incident in which there has been breakage, spillage, or suspected radioactive contamination involving radioactive materials shipments. Aircraft in which radioactive materials have been spilled may not again be placed in service or routinely occupied until the radioation dose rate at any accessible surface is less than 0.5 millirem per hour and there is no significant removable radioactive surface contamination as determined in accordance with § 173.397 of this subchapter. When contamination is present or suspected, the package and/or materials it has touched must be segregated as far as practicable from personnel contact until needed radiological advice or assistance is obtained. The Regional Office of the U.S. Department of Energy or appropriate State or local radiological authorities can provide advice or assistance, and should be notified in cases of obvious leakage, or if it appears likely that the inside container may have been damaged. For personnel safety the carrier must take care to avoid possible inhalation, ingestion, or contact with radioactive materials that may have leaked or spilled from its package. Any loose radioactive materials and associated packaging materials must be left in a segregated area pending disposal instructions from responsible radiological authorities.

(c) Except as provided in this paragraph, no person may carry aboard a passenger-carrying aircraft any radioactive material other than a radioactive material intended for use in, or incident to, research, or medical diagnosis or treatment. Prior to May 3, 1981, this prohibition does not apply to materials which meet the requirements of § 173.391 (a), (b), or (c) of this subchapter in effect on May 3, 1979.

5. A new § 175.701 is added to read as follows:

§ 175.701 Separation distance requirements for packages containing radioactive materials in passenger-carrying aircraft.

(a) *General.* No person may carry in a passenger-carrying aircraft any package required by § 172.403 of this subchapter to be labeled Radioactive Yellow-II, or Radioactive Yellow-III unless the package is placed in the aircraft in accordance with the minimum separation distances prescribed in paragraph (b) or (c) of this section.

(b) *Separation distances.* (1) Except as provided in paragraph (c) of this section, the minimum separation distances prescribed in paragraph (b)(2) of this section are determined by measuring the

shortest distance between the surfaces of the radioactive materials package and the surfaces bounding the space occupied by passengers or animals. If more than one package of radioactive materials is placed in a passenger-carrying aircraft, the minimum separation distance for these packages shall be determined in accordance with paragraph (b)(2) of this section on the basis of the sum of the transport index numbers of the individual packages or overpacks.

(2) The following table prescribes minimum separation distances for the carriage of packages containing radioactive materials labeled Radioactive Yellow-II or Radioactive Yellow-III in passenger-carrying aircraft:

Transport index or sum of transport indexes of all packages in the aircraft or predesignated area	Minimum separation distances	
	Centimeters	Inches
0.1 to 1.0	30	12
1.1 to 2.0	50	20
2.1 to 3.0	70	28
3.1 to 4.0	85	34
4.1 to 5.0	100	40
5.1 to 6.0	115	46
6.1 to 7.0	130	52
7.1 to 8.0	145	57
8.1 to 9.0	155	61
9.1 to 10.0	165	65
10.1 to 11.0	175	69
11.1 to 12.0	185	73
12.1 to 13.0	195	77
13.1 to 14.0	205	81
14.1 to 15.0	215	85
15.1 to 16.0	225	89
16.1 to 17.0	235	93
17.1 to 18.0	245	97
18.1 to 20.0	260	102
20.1 to 25.0	300	118
25.1 to 30.0	330	130
30.1 to 35.0	360	142
35.1 to 40.0	390	154
40.1 to 45.0	420	166
45.1 to 50.0	450	177

(c) *Predesignated areas.* A package required by §172.403 of this subchapter to be labeled Radioactive Yellow-II or Radioactive Yellow-III may be carried in a passenger-carrying aircraft in accordance with a system of predesignated areas established by the aircraft operator. Each aircraft operator that elects to use a system of predesignated areas shall submit a detailed description of the proposed system to the Associate Director for Operations and Enforcement for approval prior to implementation of the system. A proposed system of predesignated areas is approved if the Associate Director for Operations and Enforcement determines that it is designed to assure that—

(1) The packages can be placed in each predesignated area in accordance with the minimum separation distances prescribed in paragraph (b)(2) of this section; and

(2) The predesignated areas are laterally separated from each other by minimum distance equal to at least four times the distances required by paragraphs (b)(1) and (b)(2) of this section for the predesignated area containing packages with the largest sum of transport indexes.

6. A new § 175.702 is added to read as follows:

§ 175.702 Requirements for carriage of packages containing radioactive materials in a cargo-only aircraft.

(a) As used in this section, the term "group of packages" means packages that are separated from each other in an aircraft by a distance of 20 feet (6 meters) or less.

(b) No person may carry in a cargo-only aircraft any package required by § 172.403 of this subchapter to be labeled Radioactive Yellow-II or Radioactive Yellow-III unless—

(1) The total transport index for all of the packages does not exceed 50.0 and the package is carried in accordance with § 175.701(a); or

(2) The total transport index for all of the packages exceeds 50.0 and—

(i) The separation distance between the surfaces of the radioactive materials packages and the surfaces bounding the space occupied by persons or animals is at least 30 feet (9 meters);

(ii) The transport index for any group of packages does not exceed 50.0; and

(iii) Each group of packages is separated from every other group in the aircraft by not less than 20 feet (6 meters), measured from the outer surface of each group; and

(iv) The total transport index for all packages containing fissile radioactive materials does not exceed 50.0.

7. § 175.703 is added to read as follows:

§ 175.703 Other special requirements for the acceptance and carriage of packages containing radioactive materials.

(a) No person may carry in an aircraf any package of radioactive materials required by § 172.403 of this subchapter to be labeled Radioactive Yellow-II or Radioactive Yellow-III closer than the distances shown in the following table to any package marked as containing undeveloped film:

Transport index	Minimum separation distance to nearest undeveloped film for various times of transit									
	Up to 2 hours		2 to 4 hours		4 to 8 hours		8 to 12 hours		Over 12 hours	
	Meters	Feet	Meters	Feet	Meters	Feet	Meters	Feet	Meters	Feet
0.1 to 1.0	0.3	1	0.6	2	0.9	3	1.2	4	1.5	5
1.1 to 5.0	0.9	3	1.2	4	1.8	6	2.4	8	3.3	11
5.1 to 10.0	1.2	4	1.8	6	2.7	9	3.3	11	4.5	15
10.1 to 20.0	1.5	5	2.4	8	3.6	12	4.8	16	6.6	22
20.1 to 30.0	2.1	7	3.0	10	4.5	15	6.0	20	8.7	29
30.1 to 40.0	2.4	8	3.3	11	5.1	17	6.6	22	9.9	33
40.1 to 50.0	2.7	9	3.6	12	5.7	19	7.2	24	10.8	36

(b) No person may accept for carriage in an aircraft packages of radioactive materials, other than limited quantities, contained in a rigid or non-rigid overpack, including a fiberboard box or plastic bag, unless they have been prepared for shipment in accordance with § 173.393(r) of this subchapter.

(c) No person may carry in an aircraft any package containing Fissile Class III radioactive materials (as defined in § 173.389(a)(3) of this subchapter), except—

(1) In a cargo-only aircraft which has been assigned for the sole use of the shipper for the specific shipment of fissile radioactive material. Instructions for the sole use must be developed by the shipper and carrier, and the instructions issued with the shipping papers; or

(2) In an aircraft in which there are no other packages required to bear a radioactive label as prescribed in § 172.403 of this subchapter. Specific arrangements must be made between the shipper and carrier, with instructions to that effect issued with the shipping papers.

§ 175.710 [Deleted]

8. § 175.710 is deleted.

(49 U.S.C. 1803, 1804, 1808; 49 CFR 1.53 and App. A to Part 1)

Note.—The Materials Transportation Bureau has determined that this document will not result in a major economic impact under the terms of Executive Order 12044 and DOT implementing procedures (44 FR 11034) nor require an environmental impact statement under the National Environmental Policy Act (49 U.S.C. 4321 et seq.). A regulatory evaluation is available for review in the Docket.

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L. D. Santman,

Director, Materials Transportation Bureau.

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